DOE/RW-0256
OCRWM Backgrounder

Cask Systems Development:
NuPac 140-B Rail/Barge Cask

INTRODUCTION

The Nuclear Waste Policy Act of 1982, as amended, made the Office of Civilian Radioactive Waste Management (OCRWM) of the U.S. Department of Energy (DOE) responsible for managing the program for the permanent disposal of spent nuclear fuel from commercial power plants and high-level radioactive waste from national defense activities.

Transportation casks will contribute toward the safety of the nuclear waste transportation system. They will protect the public and transportation workers from potential exposure to radiation during normal transportation activities and if an accident occurs. This protection is provided through the use of rugged materials designed and constructed according to regulations established by the U.S. Nuclear Regulatory Commission (NRC).

The OCRWM Cask Systems Development Program is designing a variety of casks to safely transport radioactive waste from the generator sites to a geologic repository or a monitored retrievable storage facility. Five contracts have been awarded; three to develop rail/barge casks and two for legal-weight truck casks.

As of December 1989, all five cask contractors had submitted preliminary designs to the OCRWM. The designs have been reviewed by a Technical Review Group composed of national experts in cask development areas. This backgrounder describes the Nuclear Packaging, Inc. NuPac 140-B spent fuel shipping cask for rail and barge shipments.

Contractor

Nuclear Packaging, Inc.
Federal Way, Washington

Type of Cask

100-ton rail/barge shipping cask

Size

Length—21′
Diameter—11′ **(with impact limiters)**
Weight—103.3 tons

Features

Cask body
Multilayered concentric shell

Payload
21 pressurized-water reactor or 52 boiling-water reactor intact fuel assemblies

Structural material
Stainless steel

Basket
Stainless steel

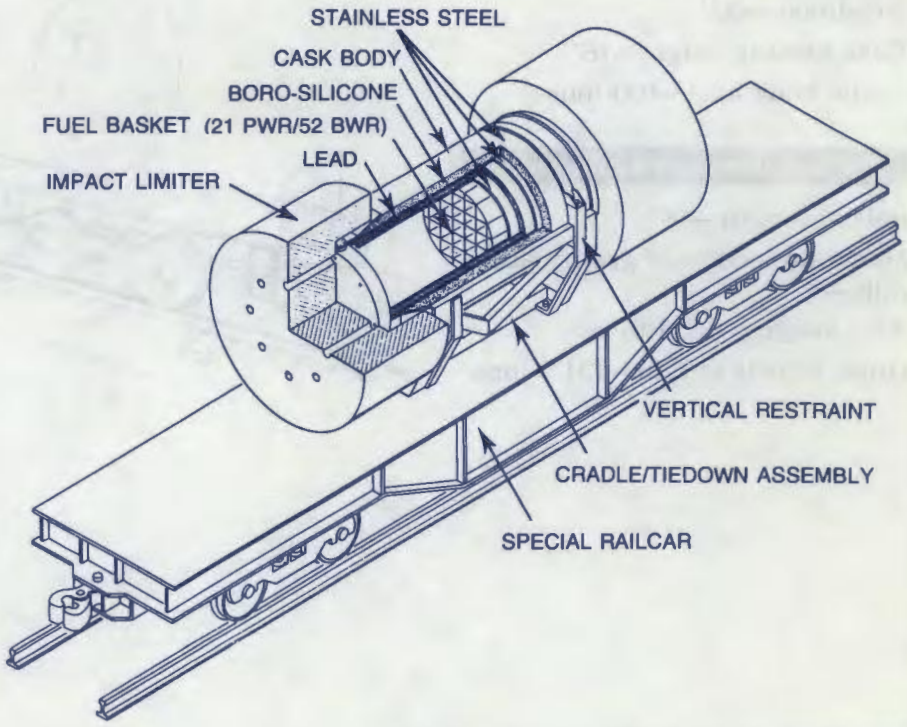
Gamma shielding
Lead

Neutron shielding
Borated silicone

Sealing type
Bore seal O-ring

Closure lid
Bolted

Impact limiters
Polyurethane with stainless steel shell



Nuclear Packaging, Inc. 140-B 100-Ton Rail/Barge Cask

Nuclear Packaging's 140-B, 100-ton rail/barge shipping cask uses a multilayered concentric shell for the cask body. Stainless steel inner and outer shells provide containment and structural integrity and enclose a lead gamma shield and borated silicone neutron shield. Copper fins are incorporated into the neutron shield to transfer heat from the cask. Smooth surfaces on all exposed areas minimize decontamination procedures after pool loading and "weeping" during shipment. The 140-B also features polyurethane impact limiters inside a stainless steel shell. The payload basket is constructed of light-weight jointed trusscore stainless steel panels clad with copper and a neutron-absorbing material.

Casks must meet design performance standards, testing conditions, and certification requirements established by the NRC. Cask design certification applications must demonstrate to the NRC, through analysis and/or testing, that casks can withstand both normal transportation and accident conditions, as specified in Federal regulations.

Published by the Office of External Relations and Policy

To provide current background information on program facts, issues and initiatives. For further information write to: Information Services Division, Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Mail Stop RW-43, Washington, DC 20585.

Interface Guidelines, Cask Size/Weight Limits

Diameter—8′ 6″ (without impact limiters)

Height (Length)—Limited by headroom

Headroom—22′

Cask loading height—18′

Crane hook load—100 tons

Railcar Interface Guidelines

Railcar length—48′

Maximum center of gravity above rails—8′

Axle loading—32.8 tons

Gross vehicle weight—131.5 tons

Shipping Cask on Railcar